

What is claimed is:

1. A system for a hydrocarbon fired burner comprising:
  - an exhaust conduit in fluid communication with the burner;
  - a recirculation conduit configured to provide at least at times, fluid communication between the exhaust conduit and burner inlet;
  - an adjustable valve configured to selectively permit the recirculation conduit to provide fluid communication between the exhaust conduit and the burner inlet;
  - a NO<sub>x</sub> sensor located in the exhaust conduit; and
  - a system controller operably connected to the NO<sub>x</sub> sensor and configured to monitor an amount of NO<sub>x</sub> emissions in the exhaust conduit, the system controller also operably connected to the valve to adjust the valve.
2. The system of claim 1, wherein the sensor is located upstream from the recirculation conduit.
3. The system of claim 1, further comprising a database operably connected to the system controller, wherein the system controller sends NO<sub>x</sub> information received from the NO<sub>x</sub> sensor to the database for storage.

4. The system of claim 1, further comprising a burner controller operably connected to the system controller, wherein the system controller sends a signal to the burner controller to shut down the burner when the NO<sub>x</sub> emissions in the exhaust conduit are at an unacceptable level.
5. The system of claim 1, wherein the system controller activates an alarm when the NO<sub>x</sub> emissions in the exhaust conduit are at an unacceptable level.
6. The system of claim 1, wherein the valve is a solenoid valve.
7. The system of claim 1, wherein the system controller includes a microprocessor.
8. The system of claim 1, wherein the system controller adjusts the valve to permit more exhaust gas enter to the burner inlet when the NO<sub>x</sub> emissions in the exhaust conduit are at an unacceptable level.
9. The system of claim 1, wherein the valve is associated with a digital processor and a system memory.
10. A system for a hydrocarbon fired burner comprising:
  - means for exhausting combustion gases in fluid communication with the burner;
  - means for recirculating combustion gases from the exhausting means with the burner;
  - means for selectively permitting the recirculation means to provide fluid

communication between the exhausting mean and the burner;

means for sensing  $\text{NO}_x$  located in the exhausting means; and

means for controlling the system operably connected to the  $\text{NO}_x$  sensing means and configured to monitor an amount of  $\text{NO}_x$  emissions in the exhausting means, the controlling means also operably connected to control the permitting means.

11. The system of claim 10, wherein the sensing means is located upstream from the recirculating means.

12. The system of claim 10, further comprising a data storing means operably connected to the system controlling means, wherein the system controlling means sends  $\text{NO}_x$  information received from the  $\text{NO}_x$  sensing means to the data storing means.

13. The system of claim 10, further comprising means for controlling the burner operably connected to the system controlling means, wherein the system controlling means sends a signal to the burner controlling means to shut down the burner when the  $\text{NO}_x$  emissions in the exhausting means are at an unacceptable level.

14. The system of claim 10, wherein the system controlling means activates an alarm when the  $\text{NO}_x$  emissions in the exhausting means are at an unacceptable level.

15. The system of claim 10, wherein the permitting means includes a solenoid valve.

16. The system of claim 10, wherein the system controlling means includes a microprocessor.

17. The system of claim 10, wherein the system controlling means adjusts the permitting means to permit more exhaust gas enter to a burner inlet when the NO<sub>x</sub> emissions in the exhausting means are at an unacceptable level.

18. A method of reducing NO<sub>x</sub> emissions in an appliance having a burner comprising:

detecting NO<sub>x</sub> emissions in exhaust associated with the burner;

determining if a recirculation valve should be one of: opened, closed, and remain the same according to predetermined criteria; and

performing one of adjusting the valve and leaving the valve in a current position in accordance with the result of the determining step.

19. The method of claim 18, further comprising saving results obtained from the detecting step.

20. The method of claim 18, further comprising at least one of:

shutting down the burner, activating an alarm, and notifying maintenance personnel when the NO<sub>x</sub> emissions are above an acceptable level.